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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,941	06/26/2003	Guodong Zhan	02307Z-137500US	4434

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EXAMINER	
DUONG, THO V	

ART UNIT	PAPER NUMBER
3743	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/606,941	ZHAN ET AL.	
	Examiner	Art Unit	
	Tho v Duong	3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2003 and 25 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *17-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *6/26/2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/17/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-16, drawn to a system of device that requires heat conduction between an exothermic device and a heat sink surface, classified in class 165, subclass 185.

II. Claims 17-31 are drawn to an invention of a structural component requiring thermal insulation in high temperature environment, classified in class 165, subclass 133.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not capable of use together and they have different effects which one requires heat conduction and the other requires thermal insulation.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Henry Heines on 8/25/2004 a provisional election was made without traverse to prosecute the invention of group I, claims 1-16.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-31 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed subject matter of "the improvement comprising interposing between said exothermic device...in a direction transverse to said heat sink surface" and "a microprocessor" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed subject matter of "the improvement comprising" renders the scope of the claim indefinite since it is not clear if what the improvement is. Applicant should state whether an apparatus or a material or else is claiming. Furthermore, the claimed subject matter of "In an application requiring the conduction of heat between an exothermic device and a heat sink" renders the scope of the claim indefinite since it is not clear whether this limitation is part of the apparatus, material or else.

Claims 1-16 are further rejected as can be best understood by the examiner in which a system including an exothermic device, a heat sink and a thermal interface material is claiming.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US 6,420,293) in view of Eckblad et al. (US 6,407,922). Chang discloses (column 1, line 10, column 2, line 33 and table 1) an improved ceramic composite material that has carbon nanotubes dispersed in a matrix of a ceramic material of less than 500 nm in diameter such as alumina; the nanotubes can be both single-wall carbon nanotubes or multi-wall carbon nanotubes; the mixture has a density of at least a relative of up to 99.8% of theoretical density; the carbon nanotubes constitute from about 0.5-50 4 of the mixture by volume. Chang does not disclose that the mixture material is disposed between a heat source and a heat sink. Ekcblad discloses (figure 1 and column 3, lines 11-52) a heat dissipating device that has a heat sink (7), a microprocessor (3), a composite material (5) being disposed there between and being uniaxially compressed in a direction transverse to the heat sink surface (at least by the weight of the heat sink on the composite material; Ekcblad further discloses that the application of carbon nanotubes an and its matrix in the heat dissipating device is for the purpose of increasing the fracture toughness of the thermal interface material and enhancing the heat conductivity of the thermal interface material along the long axis to conduct heat in one direction from the microprocessor (3) to the heat sink (7). Since Chang and Eckblad are both from the same field of studying about the property and application of carbon nanotubes, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ekcblad's teaching in Chang to use the mixture of carbon nanotubes in heat dissipation application for the purpose of increasing the fracture toughness of the thermal interface material and enhancing the

heat conductivity of the thermal interface material along the long axis to conduct heat in one direction from the microprocessor to the heat sink. As regarding claims 2, 14 and 15, the method of forming the device is not germane to the issue of patentability of the device itself. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). In this case the composite material as claimed is the same as or obvious from the composite of the prior art. Therefore, the claims are unpatentable over the prior art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Dahl et al. (US 20020130407A1) discloses a heat dissipating device having a diamondoid containing interface material.

Knowles et al. (US 20040009353A1) discloses an aligned thermal interface material comprises of fibers.

Montgomery et al. (US 20030117770A1) discloses carbon nanotubes thermal interface material.

O'Connor et al. (US 20040104014A1) discloses a diamond heat spreading.

Gurin (US 20030151030A1) discloses an enhanced conductivity nano-composite.

Dani et al. (US 20030077478A1) discloses a thermal interface material and electronic assembly.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

TD

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September 6, 2004

Tho Duong

Patent Examiner.